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EXAMINER	
MISLEH, JUSTIN P	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/619,100	Applicant(s) OHKI, MITSUHARU	
	Examiner JUSTIN P. MISLEH	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 March 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 19 is/are pending in the application.

4a) Of the above claim(s) 5 - 17 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 4, 18, and 19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 14 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed March 23, 2009 have been fully considered but they are not persuasive.

2. Applicant argues, "Kindt at best discloses a comparator sending an output signal when an electric-signal level exceeds a threshold signal level;" thus, failing to disclose the comparator as claimed in amended Claim 1. Applicant additionally argues, "Kindt does not disclose how such a dynamical setting changes the behavior of the exposure threshold ... nowhere in Kindt mentions that the exposure threshold is either monotonically increased or monotonically decreased."

3. The Examiner disagrees with Applicant's characterization of Kindt et al. During a reset of the pixel array, the photodiodes (208; see figures 2/3) are brought to a high level (e.g., 5 volts). During exposure of the pixel array, photon charges received at the photodiode decrease the potential at the photodiode in proportion to the amount of reflected light received by the photodiode (e.g., 5 volts → 0 volts). A zero volt potential at the photodiode indicates that that particular photodiode has reached saturation. Saturation essentially destroys the resulting image; thus, Kindt provides a baseline voltage to protect against this (VREF1; see column 10, lines 14 - 20). Hence, any signal output on the column readout line, after exposure, will be the remaining voltage (e.g., 5 volts - 0 volts) plus the baseline voltage (e.g., 1 volt - near saturation - plus 0.5 volt baseline for a total of 1.5 volts).

4. Subsequently, Kindt et al. compare the column readout voltage to VREF2, which is controlled by the reference circuit (X42). Therefore, the output of the comparator will be the difference between the total voltage (e.g., 1.5 volts) and VREF2. Kindt et al. provide an advantage in that VREF2 can be statically set or dynamically set during integration. If VREF2 is statically set to 90% of saturation; VREF2 will be set at 0.5 volts (using the example above). Similarly, if VREF2 is statically set to 80% of saturation; VREF2 will be set at 1 volt (using the example above). Figure 9 shows an example of VREF2 being statically set. Given a total voltage of 1.5 volts, the signal would not be considered saturated (using the example above) and the output of the comparator would be high to continue exposure.

5. When VREF2 is dynamically set during integration, Kindt et al. specifies that VREF2 becomes a function of saturation (see column 10, line 13 - column 11, line 29). In other words, Kindt et al. would move VREF2 from 100% saturation to 90% saturation to 80% saturation or, in other words, from 0 volts to 0.5 volts to 1 volt, etc. Hence, as the photodiode is exposed, the pixel array output voltage decreases while VREF2 increases until the decreasing output voltage becomes lower than the increasing threshold voltage.

6. The Examiner's analysis of Kindt et al. show the deficiencies in Applicant's arguments. First, in order for the pixel array output voltage to surpass the VREF2 threshold voltage, the pixel array output voltage must be lower than the threshold voltage, as now recited by amended Claim 1. Second, since the increasing of VREF2 is a function of pixel array saturation, VREF2 increases monotonically in nature, as previously recited in Claim 1. For these reasons, the Examiner will maintain the rejection.

Specification

7. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 1 – 4, 18, and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kindt et al. (US 7,038,820 B1) in view of Clark (US 6,529,241 B1).

The Examiner's response to Applicant's arguments above is fully incorporated into the rejections below.

10. For **Claim 1**, Kindt et al. disclose, as shown in figures 2 and 4, an imaging apparatus comprising:

a photoreceptor element (1100) having an output line ("column readout line"), the photoreceptor element sending an electric-signal level to the output line in accordance with an intensity of light received by the photoreceptor element (see column 10, lines 21 – 41);

a comparator (Threshold Detector X41) coupled with the output line of the photoreceptor element, the comparator (Threshold Detector X41) comparing the electric-signal level from the output line ("column readout line") with a threshold electric-signal level (V_{REF1} and V_{REF2}), and

sending an output signal when the electric-signal level is lower than the threshold electric-signal level (see column 10, lines 7 – 20); and

wherein the threshold electric-signal level (V_{REF1} and V_{REF2}) monotonically increases from an initial threshold electric-signal level when the electric-signal level attenuates, as time elapses (“The exposure threshold may be statically set by the first and second reference voltages, or dynamically set by changing the second reference voltage during the integration time interval”; see column 10, line 63 – column 11, line 5).

The claim language, as amended, simply requires, "wherein the threshold electric-signal level increases from an initial threshold electric-signal level as time elapses.” However, the Examiner notes the claim language does not define an “initial threshold electric-signal” or a starting point from which “time elapses”. In the case of Kindt, Kindt states, “the exposure threshold may be statically set by the first and second reference voltages, or dynamically set by changing the second reference voltage during the integration time interval" (see column 10, line 66 – column 11, line 3). Kindt further states, “the exposure threshold may be set to a level corresponding to 100% saturation, or another level such as 80% or 90% of the saturation limit for the pixels” (see column 11, lines 6 – 9).

The Examiner submits that time is always elapsing; therefore, without a starting point, this feature is inherent to both the claim language and Kindt. Furthermore, the Examiner submits that since the exposure threshold, in Kindt, is capable of being varied between 100% and 80% saturation during the integration interval, the threshold electric-signal level must increase at some point from an initial electric-signal level as time elapses.

Furthermore, the Examiner respectfully submits that the threshold electric-signal level is based upon the combination of V_{REF1} and V_{REF2}. In the case of Kindt, Kindt states, "the exposure threshold may be statically set by the first and second reference voltages, or dynamically set by changing the second reference voltage during the integration time interval" (see column 10, line 66 – column 11, line 3). Kindt further states, "the exposure threshold may be set to a level corresponding to 100% saturation, or another level such as 80% or 90% of the saturation limit for the pixels" (see column 11, lines 6 – 9). Therefore, any change to one of V_{REF1} or V_{REF2} would indeed result in the combination of V_{REF1} or V_{REF2} (i.e., the threshold electric-signal level) being monotonically increased from the initial threshold electric-signal level when the electric-signal level attenuate.

Kindt et al. do not specifically disclose storage means, to which a clock signal is input, for recording information regarding a time of generation of the output signal from the comparing means.

On the other hand, Clark also discloses an imaging apparatus having a photoreceptor element for outputting an electric-signal level in accordance with light and a comparing means for comparing the electric-signal level with a threshold electric signal level (see figures 1, 4, and 5). More specifically, Clark teaches an imaging apparatus with a photocell (100) and a comparing means (control circuit (CCKT)) such that an integration period, which begins with photocell reset and ends when the electric-signal level of the photocell crosses a threshold electric-signal level, is measure in units of time (see steps 414 – 428; figure 4 and as stated in column 5, line 22 – column 6, line 35). Furthermore, Clark teaches, as stated in column 6 (lines 21 – 27), "the time at which MONITOR is pulled high, and/or the integration time interval … for

the group of cells connected to MONITOR is stored by the imaging system. This interval is then used to computer the energy that was incident on the group of cells after obtaining the photocell output values at BL in step 430." Therefore, Clark clearly teaches storage means, to which a clock signal is input, for recording information regarding a time of generation of the output signal from the comparing means, as claimed.

Hence, at the time the invention was made it would have been obvious to one with ordinary skill in the art to have included a storage means, to which a clock signal is input, for recording information regarding a time of generation of the output signal from the comparing means, as taught by Clark, into the imaging apparatus of Kindt et al. for the advantage of providing "a better technique of preventing saturation in photocells and sensor arrays … that helps maximize dynamic range" (see Clark, column 2, lines 19 – 27).

11. As for **Claim 2**, Kindt et al. disclose, as shown in figures 2 and 4, wherein the photoreceptor element (1100) is set to an initial-setting electric-signal level by an initialize signal ("During the reset time interval the pixel array is reset such that the pixels are initialized to an initialization voltage"; see column 9, lines 66 and 67) and the electric-signal level on the output line is lowered in accordance with the intensity of light received ("a photocurrent (I_p) will flow from the cathode to the anode of the photodiode when the photodiode receives photons (light). The photocurrent (I_P) discharges the photodiode's depletion layer capacitance (Cd) and causes the voltage across the photodiode 208 to drop"; see column 6, lines 45 – 49), wherein the comparing means (Threshold Detector X41) outputs an output signal on condition that the electric-signal level on the output line of the photoreceptor element has become lower than or equal to the threshold electric-signal level (see column 9, lines 47 – 60), and wherein the

threshold electric-signal level becomes higher as time elapses ("The exposure threshold may be statically set by the first and second reference voltages, or dynamically set by changing the second reference voltage during the integration time interval"; see column 10, line 63 – column 11, line 5. "The exposure threshold may be set to a level corresponding to 100% saturation, or another level such as 80% or 90% of the saturation limit for the pixels … An overexposure margin is realized by stopping the exposure when the exposure threshold of the observed pixels reaches a level below 100% of their saturation limit (e.g., 80% of saturation). The dynamic range of the system is not detrimentally affected by reducing the exposure threshold of the system. For example, an exposure threshold corresponding to 80% of the saturation limit results in a loss of dynamic range of only 2 dB." see column 11, lines 6 – 29).

Kindt et al. clearly disclose dynamically setting the threshold electric-signal level during an integration period, while additionally being capable of varying the threshold from 100% to 80%. Therefore, a combination of these teachings would certainly yield "wherein the threshold electric-signal level becomes higher as time elapse", as claimed.

12. As for **Claims 3, 18, and 19**, as indicated above, Kindt et al. disclose wherein the photoreceptor element is set to an initial-setting electric-signal level by an initialize signal and the electric-signal level on the output line is lowered in accordance with the intensity of light received, wherein the comparing means outputs an output signal on condition that the electric-signal level on the output line of the photoreceptor element has become lower than or equal to the threshold electric-signal level.

Also, as indicated above, Clark teaches an imaging apparatus with a photocell (100) and a comparing means (control circuit (CCKT)) such that an integration period, which begins with

photocell reset and ends when the electric-signal level of the photocell crosses a threshold electric-signal level, is measure in units of time (see steps 414 – 428; figure 4 and as stated in column 5, line 22 – column 6, line 35). Furthermore, Clark teaches, as stated in column 6 (lines 21 – 27), "the time at which MONITOR is pulled high, and/or the integration time interval … for the group of cells connected to MONITOR is stored by the imaging system. This interval is then used to computer the energy that was incident on the group of cells after obtaining the photocell output values at BL in step 430."

However, Clark additionally discloses, a calculation unit (system controller 722; see figure 7), wherein the calculation unit (722) receives input of the time information recorded in the storage means, calculates a value of optical energy received by the photoreceptor element per unit time according to a formula (Vinit-Vth(t))/Tn where Vinit denotes the initial-setting electric-signal level, Vth(t) denotes the threshold electric-signal level, and Tn denotes the time information, and calculates a pixel value based on the value of optical energy received (see column 6, lines 21 – 27, and figure 5; "the integration time interval (here being 9-3=6 time units) … is stored by the imaging system … this interval is then used to compute the energy that was incident on the group of cells after obtaining the photocell output values").

13. As for **Claim 4**, Kindt et al. disclose, as shown in figure 4, wherein the comparing means (Threshold Detector X41) compares an amplified electric-signal level (output from source-follower amplifier 204; see figure 2) of the electric-signal level on the output line ("column readout line") of the photoreceptor element (1100) with the threshold electric-signal level (V_{REF1} and V_{REF2}).

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 571.272.7313. The Examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David Ometz can be reached on 571.272.7593. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Justin P. Misleh/
Primary Examiner
Group Art Unit 2622
June 3, 2009